Warm Tiles®

FLOORING SUPPLY SHOP

EASYHEAT Warm Tiles ELITE

Warm Tiles Elite Mats

Installation and Operating Instructions

EASYHEAT®

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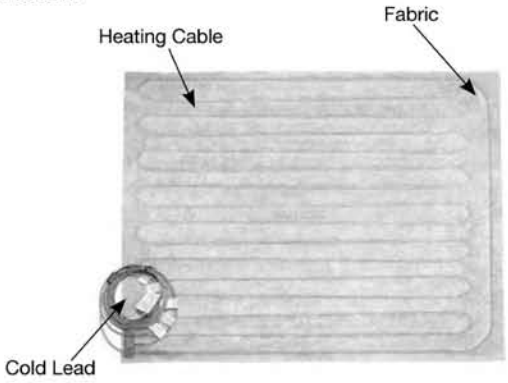
Warm Tiles Elite Custom Floor-Warming Mat
Installation and Operating Instructions

Thank you for choosing the EasyHeat® Warm Tiles® Elite (WTE) mat system for floor warming. This product has been designed to gently warm flooring materials such as marble, ceramic, glass and porcelain tile, slate, granite and poured or dimensional stone, in addition to laminate and engineered hardwood products. Warm Tiles greatly enhances the comfort level of these beautiful flooring materials. Warm Tiles floor warming systems utilize state-of-the-art heating cables, hardware and electrical controls for an economical and long lasting floor warming system. Warm Tiles systems are designed for use inside residential and commercial buildings of standard North American construction.



WTE Mat

SKILL LEVEL

It is recommended that WTE mat systems be installed by professional electricians, or by skilled homeowners who have adequate knowledge of flooring and electrical wiring, and in accordance with all applicable national and local electrical and building codes and ordinances, regulations and inspection procedures. Electrical inspection may be required before, during and/or after system installation. Consult with your local electrical inspection authority before beginning installation.

WARNINGS

Improper installation, operation or maintenance of this product may result in injury or death from electric shock or fire. It may also result in cable failure to warm the floor properly. Read and follow the instructions and warnings in this manual. If you have questions, call toll-free (800) 537-4732 in the United States or (800) 794-3766 in Canada for assistance. Give this manual to anyone who will be using this system, including future users and homeowners.

⚠ Do not energize rolled-up heating mat: the cable will overheat.

⚠ Do not modify the WTE mat. Do not remove the heating cable from the mat: the cable will be exposed to damage.

⚠ Do not alter the length of the heating cable (inside the heating mat) to suit a floor area larger or smaller than the recommended range for that mat: the cable will overheat or not warm properly. Physical injury or fire may result if altered. Only the cold lead may be cut to suit the location of the electrical connection box.

⚠ Do not install heating mat under carpet, vinyl composition or linoleum type floors: the cable will overheat or may discolor flooring material. Do not install heating mat under any type of nailed-down wood flooring: floor nailing will irreparably damage the cable (inside the mat) and may result in physical injury or risk of fire. Do not use this system for other types of applications; contact EasyHeat Technical Support for professional advice.

⚠ Electrical inspection may be required before, during and/or after installation of the Warm Tiles system. Contact your local electrical inspection authority for more information.

⚠ The entire heating mat must be embedded in a cement-based mortar or the cable will overheat.

⚠ The circuit supplying the heating cable must have ground fault protection; this is mandatory by electrical code for some applications in many regions. Ground fault protection will detect minor damage to the cable and disconnect the cable before the damage becomes severe so that it can usually be repaired. Consult an electrical inspector to determine the specific ground fault requirements for your application prior to installation. If you are unsure that your circuit has ground fault protection, consult an electrician. Per US National Electrical Code – Installation in kitchen or bathroom requires that this product be installed on a circuit protected by a separate Ground Fault Circuit Interrupter (GFCI).

⚠ If the system is connected to a GFCI (or equivalent) which trips during normal operation, and cannot be reset, there is likely a fault in the heating cable. No attempt should be made to re-energize the system. Under no circumstances should the GFCI be bypassed: this may result in injury from electric shock. Contact EasyHeat Technical Support for advice.

⚠ These instructions have been prepared for use with standard North American building construction practices. If your building construction differs, consult an appropriate electrical professional.

⚠ Do not use staples to affix cold lead, heating cables or thermostat sensor wire, as this could puncture the heating cable and cause the cable to overheat or result in injury from electric shock.

⚠ The heating cable portion of the WTE mat (cable inside fabric layers) must not be installed in walls because the cable will overheat.

⚠ The installer must inspect and remove damaged or defective heating mats before they are covered or concealed. Contact EasyHeat Technical Support for professional advice.

⚠ The installer must mark the appropriate circuit breaker reference label indicating which branch circuit supplies the circuits to the electric WTE heating mat.

⚠ Do not use sharp tools or power tools to clean grout line; this may damage the WTE mat.

⚠ Minimum installation temperature: 0°C (32°F)

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US T. (800) 537-4732
CAN T. (800) 794-3766

TOOLS/MATERIALS REQUIRED FOR INSTALLATION

- drill
- assorted bits
- chisel
- megohmmeter
- ohmmeter
- trowels
- wire stripper/cutter
- other usual tools/materials for electrical and tile flooring installations

PREPARATION FOR INSTALLATION

DO NOT INSTALL MATS AT THIS TIME

OVERVIEW

- WTE mats are available in a variety of sizes and shapes. Various floor areas may be warmed with a single mat or by using a combination of mats. Do not alter the length of the mat or heating cable to suit a floor area larger or smaller than the recommended range for any mat. Ensure the mat you have chosen is the correct size and voltage.
- When using multiple WTE mats, ensure the outside wire of adjacent mats are within 1-1/2" to 3" of one another to ensure the cable spacing and heat distribution are consistent across the floor. Spacing closer than 1-1/2", can cause the cable to overheat. Do not space mats greater than 3" apart, as the floor will not warm to a comfortable temperature.
- The mat cannot be re-shaped to fit a floor area different than its original shape.
- The heating cables are inside the mat between the fabric layers; the complete mat is laid directly on the floor.
- All cold leads and the power supply must terminate and be connected within an appropriate electrical connection box. The electrical connection box and conduit must be listed/approved and of sufficient volume to accommodate the wiring/connectors associated with the thermostat/control, cold leads and power supply wiring.
- Space between the outside perimeter of the heating mat and the surrounding room walls may be set to 1 1/2" to 6".
- Thermal insulation of space below the floor to be heated is optional. It is, however, required that insulation be installed where the temperature of the underlying space is expected to be less than 50°F/10°C. This will reduce energy consumption and improve the performance of your Warm Tiles system. Where possible, it is also recommended to insulate above the cold air return ducts under the floor.
- The heating mat will have to be embedded in a masonry base (cementituous based mortar/thinset).
- It is recommended the Warm Tiles system be the only load on the power supply circuit.
- There is no top or bottom side to the WTE mats. Mats may be flipped in any direction to place the lead wire as close as possible to the electrical connection box.
- If a thermostat is used to control the system, install the thermostat sensor wire at the same time as the heating mat installation, as it must also be embedded in the cementitious based mortar.

SELECT THERMOSTAT, SWITCH CONTROL

It is recommended a floor temperature sensing thermostat be used to control the WTE floor warming mat system. This thermostat must have the appropriate voltage, current and agency approvals, such as Underwriters Laboratories (UL) or Canadian Standards Association (CSA) for the area in which it is being installed. Note also that floor temperature sensing thermostats are provided with a sensor cable that must be installed in the floor at the same time as the heating cable/mat is installed. EasyHeat offers a wide variety of thermostats suitable for your application – visit www.easyheat.com.

Relays can be used in conjunction with a thermostat to control large heated areas – EasyHeat offers relay kits for use with thermostats – visit www.easyheat.com.

PLAN TILING METHOD

Do not install mat at this time.

TILE TIPS: To minimize potential tile cracking, it is important that the subfloor on which the tile is to be laid is sufficiently rigid.

- It may be necessary to apply an underlayment such as backerboard, plywood or metal lathe and mortar to achieve a solid application surface to ensure the floor is stable, smooth and clean. Tile experts typically require a 1-1/2" thick subfloor base for ceramic tile. Consult your local tile service center, the Tile Council of America, or the Tile, Terrazzo and Marble Association of Canada for methods and materials.
- WTE mats can be installed in tiled showers or other areas in the bathroom, although it is recommended that you check with your local electrical inspector first to verify that this application is allowed in your jurisdiction. Waterproof membranes are usually used in these areas and in other areas where large water spills may occur. These membranes are typically composed of a thin waterproof film (max. 0.080" thick). These membranes can be used in conjunction with the Warm Tiles systems by laying the mat on the floor first, then covering with a scratch coat of cement-based underlayment. The waterproof membrane is then installed on top of the scratch coat, and the flooring completed in the usual manner. The heat will not usually affect waterproofing membranes, but you should check with the manufacturer to be certain.
- Anti-fracture membranes are sometimes installed in floors to accommodate stress caused by differential movement of the sub-floor components. This stress can be a major cause of cracking and delamination of tiled surfaces. Anti-fracture membranes are usually installed in a similar manner to waterproof membranes; Warm Tiles mats are laid on the floor first, and then covered with a scratch coat of cement-based mortar. The anti-fracture membrane is then typically installed on top of the scratch coat and the floor finished in accordance with the installation instructions for the membrane.
- If using metal lathe, always apply a scratch coat on the lathe prior to laying mat – the metal lathe can be sharp enough to cut the heating cable. The scratch coat will provide a smooth surface for the mat.
- For optimum performance, the top of the heating cables should be a maximum of 3/4" below the finished floor surface. However, if the floor is insulated below, it is possible to increase this depth to 2-1/2".
- Always keep a few spare tiles in case a repair is necessary at a future date.

ELECTRICAL ROUGH-IN INSTALLATION: NEW CONSTRUCTION

For new construction, it is recommended that rough-in be completed before drywalling begins.

N1. Determine the appropriate location and height for the electrical connection box. A single mat installation would typically require a 15 cubic inch box. Consider proximity to other outlet boxes, ease of routing the cold lead to the heated area, and accessibility of the heating controller during normal use. Typically the cold lead enters the same wall cavity in which the electrical connection box is located.

N2. Install the electrical connection box, adjusting box projection to suit expected wall covering *(Figure N2)*.

Figure N2. ECB installation

N3. Prepare a fish hole, first by drilling a horizontal 3/4" diameter hole through the sill plate approximately 1-½" deep.

N4. Drill a second 3/4" diameter hole vertically through the sill plate connecting to the first hole *(Figure N4)*. If installation will require two mats, a second fish hole should be drilled a minimum of 4" from the first but within the same wall cavity *(Figure N4)*.

Figure N4. Fish hole preparation

N5. Clear fish holes of wood chips and install cable guards over holes (drywall ledge at top, facing out) over the holes *(Figure N5)*. Fish cords and cable guards are not included with the mat but are available with the purchase of EasyHeat thermostats.

Figure N5. Guards installation

N6. Install a fish cord through the sill plate, pull through the wall cavity, and secure in the electrical connection box. ONE ADDITIONAL FISH CORD WILL BE REQUIRED IF THE HEATING CONTROLLER USES A FLOOR TEMPERATURE SENSOR.

N7. Fasten "Do Not Remove" tags or equivalent tags to fish cords at the sill plate holes *(Figure N7)*.

Figure N7. "Do Not Remove" tags installation

N8. Install Power Supply Wiring, but DO NOT energize or connect to the heating controller until the finished flooring has been installed. Install conduit if required - consult with your local inspection authority *(Figure N8)*.

Figure N8. Conduit installation

Drywall installation can now be completed and heating cable can be installed later. *Multiple cable sets may require larger boxes. Consult your local electrical authority.*

ELECTRICAL ROUGH-IN INSTALLATION: REMODELING PROJECT

R1. Determine the appropriate location and height for the electrical connection box. A single cable installation would typically require a 15 cubic inch box. Consider proximity to other outlet boxes, ease of routing the cold lead to the heated area, and accessibility of the heating controller during normal use. Typically the cold lead enters the same wall cavity in which the electrical connection box is located.

R2. Remove base moldings, and drywall only as required, in areas where fish holes are to be drilled, exposing upper edge of sill plate.

R3. Drill a horizontal 3/4" diameter hole through the sill plate approximately 1½" deep. If installation is planned for two mats, a second fish hole should be drilled a minimum of 4" from the first, but within the same cavity *(Figure R3)*.

Figure R3. Fish hole preparation

R4. Use a chisel to completely notch wood from the sill plate above each hole. Clear fish holes of wood chips and install cable guards or equivalent (drywall ledge at top, facing out) over the holes *(Figure R4)*.

Figure R4. Fish hole clearing

R5. Use electrical connection box as template to mark outline on wall. Carefully cut out the minimum possible amount of drywall to prevent the need for wall repair after heating controller has been installed *(Figure R5)*.

Figure R5. Marking outline on wall

R6. Install a fish cord through the sill plate, pull through the wall cavity and secure in the electrical connection box. ONE ADDITIONAL FISH CORD WILL BE REQUIRED IF THE HEATING CONTROLLER USES A FLOOR TEMPERATURE SENSOR. *(Figure R6)*.

Figure R6. Fish cord installation

R7. Install Power Supply Wiring in the electrical connection box, but do NOT energize or connect to the heating controller. Install conduit, if required (consult with your local electrical inspection authority). *Multiple cable sets may require larger boxes. Consult your local electrical authority.*

INSTALLING THE WTE MAT

I1. Ensure the subfloor is clean and free of debris. Consider the location of the electrical connection box, and the routing of the cold lead over to the point where they will enter the wall cavity.

I2. Dry fit the WTE mat to ensure it fits the intended heated area.

I3. Insulation and resistance test

Insulation Test
To ensure that the Warm Tiles mat has not been damaged, use a megohmmeter with one probe connected to the conductor and the other probe connected to the ground braid. Use 500 Vdc minimum. The megohmmeter should read min 10 Mohms.

Resistance Test
Using a calibrated digital ohm/multimeter, check the resistance of each mat and the sensor wire before proceeding with floor finishing ensuring no damage has occurred during installation. The resistance of the cable in the mat should be greater than 10 ohms but less than 775 ohms. The resistance of the sensor wire should be between 7 and 14 Kohms.

Make sure you record readings in the Mat Resistance Log attached to this document.

NOTE: Your local electrical inspector may require inspection of the mat installation prior to proceeding with the floor finishing.

I4. Route supply leads to electrical connection box according to the path. Ensure leads are flat; temporarily tape down as necessary.

I5. Prepare the thinset/mortar to adhere the WTE mat to the subfloor. Using a ¼" x ¼" square notch trowel, spread a coat of fresh thinset/mortar over the area to be covered by the WTE mat. Make the thinset/mortar grooves parallel to the mat wires. If laying the WTE mat in a large area, make sure to work on one manageable section at a time.

I5. Apply thin layer of mortar to floor

I6. Place the WTE mat onto the fresh thinset/mortar pressing firmly with a grout float or lightweight roller. Create 100% contact between the heating mat, the thinset/mortar, and the subfloor. Press out any air bubbles or wrinkles and ensure that the surface is flat.

I6. Lay down WTE mat

I7. To test the bond between the WTE mat and the subfloor, while the thinset/mortar is still wet, peel a portion of the mat back from the thinset/mortar you have adhered the subfloor. At least 80% of the underside of the mat should be covered with thinset/mortar. **Do not energize.**

I8. Retest Insulation and resistance as per **I3 - Insulation and resistance test** - and record readings in the Mat Resistance Log.

INSTALLING SURFACE COVERING

Tile and Stone Surfaces Covering

T1. Install WTE mat as per I1 to I8. Ensure insulation and resistance tests have been performed and recorded.

T2. When installing a floor-sensing thermostat, position the floor-sensing probe on top of the fabric, midway between two adjacent Heating Cable runs but not closer than 1/2" to a heating cable *(Figure T2)*. Please see floor-sensing thermostat instructions for proper connection procedures.

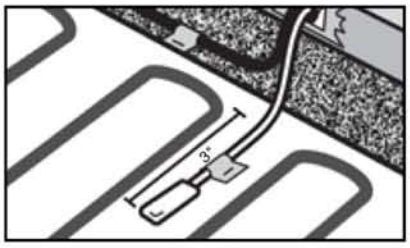

Figure T2. Probe thermostat installation

T3. Apply a coat of thinset/mortar on top of WTE mat according to the tile or stone manufacturer' recommended thickness. Install tile or stone on top of the thinset/mortar. Use only cement based self-levelling compounds. Apply the self levelling compound over the cables and allow to cure, then proceed to install the surface flooring. Tile must be installed according to requirements of ANSI A108.5 or equivalent. Consult with your flooring supplier for advice.

T3. Apply thin set and install floor surface

Clean excess thinset/mortar from grout lines with a sponge or small brush and water as tile is being laid. Do not use sharp objects or power tools to clean grout lines, as this may damage WTE mat.

T4. After thinset/mortar has cured, apply grout.

NOTE: Before activating the WTE mat, allow the thinset/mortar and

grout to cure according to manufacturer's guidelines.

Floating Laminate and Engineered Wood covering

For all Laminate and Engineered Wood applications, the total combined R-values of all floor coverings over WTE mat must not exceed R 1.5.

L1. Install WTE mat as per I1 to I8. Ensure insulation and resistance tests have been performed and recorded.

L2. If installing a floor-sensing thermostat, ensure floor-sensing probe has been installed at this point. Please see floor-sensing thermostat instructions for proper connection procedures.

L3. Apply self leveled thinset/mortar to a minimum ¼" thick coat over WTE mat surface and supply leads **OR** using the flat side of the trowel, apply a minimum ¼" thick coat of thinset/mortar over WTE mat surface and supply leads. Ensure the thinset/mortar is level and smooth. Allow self leveling or thinset/mortar to cure as per manufacturer's guidelines.

L4. Install moisture barrier, if applicable, and underlay as per manufacturer's instructions.

L5. Install laminate/engineered wood floor as per manufacturer's instructions.

INSTALLING CONTROL/POWER CONNECTION

Installation of all control/wiring devices must be according to manufacturer's instructions.

PREPARE FOR CONNECTIONS AS FOLLOWS:

C1. Ensure the supply branch circuit has been disconnected and de-energized.

C2. Trim excess length of both supply branch circuit and cold lead cables, as necessary, leaving a minimum of 6" projecting from the electrical connection box.

C3. Prepare each cold lead conductor for splicing/termination: Carefully remove black outer jacket. Avoid damage to the underlying ground braid. Separate braid wires from cold lead; tightly twist braid strands together. Strip 1/2" of cold lead conductor insulation.

C4. Strip 1/2" of insulation from supply circuit conductors.

C5. Conduct a final test on the cable before connecting the thermostat in accodrance with L1 and record readings in the Mat Resistance Log.

C6. Proceed with control device connections following associated installation instructions.

C6. Do not energize/test the system until the mortar/grout materials have fully set — refer to the manufacturer's instructions for cure time. This will ensure that the setting of the mortar/grout will not be compromised by the heat from the cables.

NOTE: Your system installation may require an electrical inspection at this time. Consult your local electrical and/or building inspection authorities. When you are ready to energize your system, consult the operating instructions with the specific heating controller.

OPERATING INSTRUCTIONS

- Use a thermostat to set floor temperature.
- When first energized, the Warm Tiles system may take up to 3 hours to fully warm your floor, although the actual time may vary depending on the ambient conditions.
- Energy consumption will vary depending on user preferences (warmer floors require more energy), but typically will be about 70% of installed capacity when the system is energized. For example, if about 200 Watts (0.2 KW) are installed and operated for about 80 hours per week (about half of the time), energy consumption will be about 10 kWh per week (0.2 x 80 x 0.7).
- At 10 cents per kWh, the weekly energy cost would be about $1.00. Note that the heat generated by the Warm Tiles system will be, to some extent, redistributed in the home, thereby offsetting the heat required from the primary space heating source.
- Energy consumption can be minimized by turning the system off when floor heating is not required, but time must also be allotted to re-warm the floor once the heating cycle is resumed. EasyHeat's programmable "setback" thermostats can reduce this time to less than one hour by decreasing the temperature set point during each of the setback periods to a user specified value.
- Avoid placing thick mats or rugs on your heated floor, especially in the area where the sensor of a floor thermostat is located; such surface coverings impede the transfer of heat away from the cables and will cause the floor area beneath them to be warmer than in other areas. The use of bath mats and area rugs is acceptable, provided they are no more than ¼" in thickness. Avoid mats with rubber or vinyl type backing, as these may decompose in the presence of heat resulting in floor staining.
- Avoid placing floor-level furniture — such as futons or mattresses — onto the floor directly over heated areas. This will also impede the transfer of heat away from the cables.

TROUBLESHOOTING TIPS

Symptom	Possible Cause	Corrective action
The system does not seem to be heating	System not connected	Check circuit breaker, reset if necessary Check GFCI/GFI, reset if necessary Check all connections between breaker and control Test the voltage at each connection, starting at the breaker panel, proceeding toward the control
	Heating control device is not working properly	Verify that the heating control device is correctly installed and functioning properly; check with the associated heating control device operating manual and/or contact the manufacturer
	Damaged cable	De-energize the system. Disconnect the mat from the heating control device. Test every individual mat according to I3. Contact EasyHeat for assistance.
The overall floor surface feels cold after the system has been energized for more than three hours	Set point of heating control device is too low	Increase set point of heating control device to a comfortable level
	Heating control device is incorrectly installed and/or not functioning properly	Verify that the heating control device is correctly installed and functioning properly; check with the associated heating control device operating manual and/or contact the manufacturer
	Sub-floor is exposed to outdoor condition	Install thermal insulation under sub-floor
Overall floor surface feels too hot when the system is energized	Heating control device is not set properly	Reduce set point of the heating control device to a comfortable level
	Floor temperature sensor incorrectly installed	Adjust temperature sensor installation such that it senses the floor temperature
	Heating control device failed	Replace heating control device
The floor surface feels unusually hot or the circuit breaker trips when the system is energized	Cable may be damaged	De-energize the system immediately and contact EasyHeat for assistance **Note:** In the event that the heating cable has been damaged, the fault can typically be located and field repaired with minimal flooring removal
Ground fault is tripping	Cable may be damaged	De-energize the system. Disconnect the mat from the heating control device. Test every individual mat according to **I3**. Contact EasyHeat for assistance.
	Floor/cable have experienced flooding	Allow to dry - the mat is not designed to be submerged. Contact EasyHeat for assistance.

MAT RESISTANCE LOG

Installer:_____ **Date:**_____

Catalog	Tag	Mat code	Watts	Amps	Ohms	Continuity test (digital ohm/multimeter; mat 10 - 775 ohms, sensor wire 7 -14 Kohms)			Insulation resistance test (megohmmeter 10 Mohms minimum 500 Vdc minimum)		
						Initial (out of the package)	Before installing floor covering	Final	Initial (out of the package)	Before installing floor covering	Final
Sensor wire									X	X	X

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